IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application. An identifier indicating the status of each claim is provided.

Listing of Claims

1. – 3. (Canceled)

4. (Previously Presented)   An information processing apparatus comprising:

reading means for reading data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

improvement-information requesting means for requesting another improvement information used for improving the quality of the data read by the reading means; and

quality improving means for improving the quality of the data according to at least both the improvement information and the another improvement information obtained according to a request made by the improvement-information requesting means and for outputting high-quality data,

wherein the data is degraded data obtained by degrading the original data,

wherein the quality improving means can restore the original data from the degraded data according to at least both the improvement information and the another improvement information,

wherein the data is high-order bits of the original data and the improvement information is a part of low-order bits of the original data; and

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wherein the quality improving means combines the high-order bits of the original data, which is the data; the part of low-order bits of the original data, which is the improvement information; and the other part of lower-order bits of the original data, which is the another improvement information, to output high-quality data having higher quality than the data.

5. (Original)   An information processing apparatus according to Claim 4, further comprising determination means for determining whether the quality improving means can apply quality improvement processing to the data according to the improvement information and at least one piece of the another improvement information obtained according to a request made by the improvement-information requesting means,

wherein the quality improving means improves the quality of the data according to a result of determination made by the determination means and outputs high-quality data.

6. (Previously Presented)   An information processing apparatus comprising:

reading means for reading data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

improvement-information requesting means for requesting another improvement information used for improving the quality of the data read by the reading means; and

quality improving means for improving the quality of the data according to at least both the improvement information and the another improvement information obtained according to a request made by the improvement-information requesting means and for outputting high-quality data,

wherein the data is degraded data obtained by degrading the original data,

wherein the quality improving means can restore the original data from the degraded data according to at least both the improvement information and the another improvement information,

wherein the data is first sub-sampled data obtained by sub-sampling the original data at a first phase and the improvement information is second sub-sampled data obtained by sub-sampling the original data at a second phase; and

wherein the quality improving means combines the first sub-sampled data, which is the data; the second sub-sampled data, which is the improvement information; and third sub-sampled data obtained by sub-sampling the original data at a third phase, which is the another improvement information, to output high-quality data having higher quality than the data.

7. (Original)   An information processing apparatus according to Claim 6, wherein the data is first sub-sampled data obtained by sub-sampling the original data at a first phase and the improvement information is second sub-sampled data obtained by sub-sampling the original data at a second phase; and

the quality improving means comprises:

extracting means for extracting at least first sub-sampled data, second sub-sampled data, and third sub-sampled data around the target data in the high-quality data;

class-classification means for performing class-classification according to data extracted by the extracting means and for outputting a class; and

prediction means for predicting the target data from the extracted data according to the class output from the class-classification means.

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8. (Original)   An information processing apparatus according to Claim 7,

wherein the extracting means extracts first taps and second taps from at least the first sub-

sampled data, the second sub-sampled data, and the third sub-sampled data around the target data

in the high-quality data;

the class-classification means performs class-classification according to the first taps and

outputs a class; and

the prediction means predicts the target data by linear first-order coupling of the second

taps and learned-in-advance prediction coefficients according to the class output from the class-

classification means.

9. (Previously Presented)   An information processing apparatus comprising:

reading means for reading data and improvement information used for improving the

quality of the data from a recording medium which stores the data and the improvement

information;

improvement-information requesting means for requesting another improvement

information used for improving the quality of the data read by the reading means; and

quality improving means for improving the quality of the data according to at least both

the improvement information and the another improvement information obtained according to a

request made by the improvement-information requesting means and for outputting high-quality

data,

wherein the quality improving means comprises:

extracting means for extracting degraded data around the target data in the high-quality data;

class-classification means for performing class-classification according to data extracted by the extracting means and for outputting a class; and

prediction means for predicting the target data from the extracted data according to the class output from the class-classification means,

wherein the data is degraded data obtained by degrading the original data,

wherein the quality improving means can restore the original data from the degraded data according to at least both the improvement information and the another improvement information.

10. (Original) An information processing apparatus according to Claim 9, further comprising prediction-coefficient storage means for storing prediction coefficients obtained by learning in advance between the original data and the degraded data,

wherein the prediction means predicts the target data by linear first-order coupling of the extracted data and the prediction coefficients according to the class output from the class-classification means; and

the improvement information is a part of the prediction coefficients.

11. (Original) An information processing apparatus according to Claim 10, wherein the extracting means extracts first taps and second taps from degraded data around the target data in the high-quality data;

the class-classification means performs class-classification according to the first taps and outputs a class; and

the prediction means predicts the target data by linear first-order coupling of the second taps and the prediction coefficients according to the class output from the class-classification means.

12. – 15. (Canceled)

16. (Previously Presented)　　An information processing apparatus comprising:

reading means for reading data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

improvement-information requesting means for requesting another improvement information used for improving the quality of the data read by the reading means;

quality improving means for improving the quality of the data according to at least both the improvement information and the another improvement information obtained according to a request made by the improvement-information requesting means and for outputting high-quality data; and

improvement-information sending means for sending the improvement information to another information processing apparatus,

wherein the data is degraded data obtained by degrading the original data,

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wherein the quality improving means can restore the original data from the degraded data according to at least both the improvement information and the another improvement information,

wherein the data is high-order bits of the original data and the improvement information is a part of low-order bits of the original data; and

wherein the quality improving means combines the high-order bits of the original data, which is the data; the part of low-order bits of the original data, which is the improvement information; and the other part of lower-order bits of the original data, which is the another improvement information, to output high-quality data having higher quality than the data.

17. (Original)   An information processing apparatus according to Claim 16, further comprising determination means for determining whether the quality improving means can apply quality improvement processing to the data according to the improvement information and at least one piece of the another improvement information obtained according to a request made by the improvement-information requesting means,

wherein the quality improving means improves the quality of the data according to a result of determination made by the determination means and outputs high-quality data.

18. (Previously Presented)   An information processing apparatus comprising:

reading means for reading data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

improvement-information requesting means for requesting another improvement

information used for improving the quality of the data read by the reading means;

quality improving means for improving the quality of the data according to at least both

the improvement information and the another improvement information obtained according to a

request made by the improvement-information requesting means and for outputting high-quality

data; and

improvement-information sending means for sending the improvement information to

another information processing apparatus,

wherein the data is degraded data obtained by degrading the original data,

wherein the quality improving means can restore the original data from the degraded data

according to at least both the improvement information and the another improvement

information,

wherein the data is first sub-sampled data obtained by sub-sampling the original data at a

first phase and the improvement information is second sub-sampled data obtained by sub-

sampling the original data at a second phase; and

wherein the quality improving means combines the first sub-sampled data, which is the

data; the second sub-sampled data, which is the improvement information; and third sub-sampled

data obtained by sub-sampling the original data at a third phase, which is the another

improvement information, to output high-quality data having higher quality than the data.

19. (Original)   An information processing apparatus according to Claim 18, wherein

the data is first sub-sampled data obtained by sub-sampling the original data at a first phase and

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the improvement information is second sub-sampled data obtained by sub-sampling the original

data at a second phase; and

the quality improving means comprises:

extracting means for extracting at least first sub-sampled data, second sub-sampled data,

and third sub-sampled data around the target data in the high-quality data;

class-classification means for performing class-classification according to data extracted

by the extracting means and for outputting a class; and

prediction means for predicting the target data from the extracted data according to the

class output from the class-classification means.

20. (Original)   An information processing apparatus according to Claim 19, wherein

the extracting means extracts first taps and second taps from at least the first sub-sampled data,

the second sub-sampled data, and the third sub-sampled data around the target data in the high-

quality data;

the class-classification means performs class-classification according to the first taps and

outputs a class; and

the prediction means predicts the target data by linear first-order coupling of the second

taps and learned-in-advance prediction coefficients according to the class output from the class-

classification means.

21. (Original)   An information processing apparatus comprising:

reading means for reading data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

improvement-information requesting means for requesting another improvement information used for improving the quality of the data read by the reading means;

quality improving means for improving the quality of the data according to at least both the improvement information and the another improvement information obtained according to a request made by the improvement-information requesting means and for outputting high-quality data; and

improvement-information sending means for sending the improvement information to another information processing apparatus,

wherein the quality improving means comprises:

extracting means for extracting degraded data around the target data in the high-quality data;

class-classification means for performing class-classification according to data extracted by the extracting means and for outputting a class; and

prediction means for predicting the target data from the extracted data according to the class output from the class-classification means,

wherein the data is degraded data obtained by degrading the original data, and

wherein the quality improving means can restore the original data from the degraded data according to at least both the improvement information and the another improvement information,

22. (Original)   An information processing apparatus according to Claim 21, further comprising prediction-coefficient storage means for storing prediction coefficients obtained by learning in advance between the original data and the degraded data,

wherein the prediction means predicts the target data by linear first-order coupling of the extracted data and the prediction coefficients according to the class output from the class-classification means; and

the improvement information is a part of the prediction coefficients.

23. (Original)   An information processing apparatus according to Claim 22, wherein the extracting means extracts first taps and second taps from degraded data around the target data in the high-quality data;

the class-classification means performs class-classification according to the first taps and outputs a class; and

the prediction means predicts the target data by linear first-order coupling of the second taps and the prediction coefficients according to the class output from the class-classification means.

24. (Original)   An information processing apparatus comprising:

reading means for reading data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

improvement-information requesting means for requesting another improvement information used for improving the quality of the data read by the reading means;

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quality improving means for improving the quality of the data according to at least both the improvement information and the another improvement information obtained according to a request made by the improvement-information requesting means and for outputting high-quality data; and

improvement-information sending means for sending the improvement information to another information processing apparatus; and

improvement-information-request-signal receiving means for receiving an improvement-information request signal indicating that another information processing apparatus requests the improvement information,

wherein the improvement-information sending means sends the improvement information to the another information processing apparatus according to an improvement-information request signal received by the improvement-information-request-signal receiving means.

25. – 40. (Canceled)

41. (New) An information processing apparatus comprising:

a reading ~~means for reading~~device configured to read data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

an improvement-information requesting ~~means for requesting~~device configured to request another improvement information used for improving the quality of the data read by the reading ~~means~~device; and

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a quality improving ~~means for improving~~device configured to improve the quality of the

data according to at least both the improvement information and the another improvement

information obtained according to a request made by the improvement-information requesting

~~means~~device and for outputting high-quality data,

wherein the data is degraded data obtained by degrading the original data,

wherein the quality improving means can restore the original data from the degraded data

according to at least both the improvement information and the another improvement

information,

wherein the data is high-order bits of the original data and the improvement information

is a part of low-order bits of the original data; and

wherein the quality improving ~~means~~device combines the high-order bits of the original

data, which is the data; the part of low-order bits of the original data, which is the improvement

information; and the other part of lower-order bits of the original data, which is the another

improvement information, to output high-quality data having higher quality than the data.

42. (New)   An information processing apparatus according to Claim 41,

further comprising a determination ~~means for determining~~device configured to determine

whether the quality improving ~~means~~ device can apply quality improvement processing to the

data according to the improvement information and at least one piece of the another

improvement information obtained according to a request made by the improvement-information

requesting ~~means~~device,

wherein the quality improving ~~means~~ device improves the quality of the data according to

a result of determination made by the determination ~~means~~ device and outputs high-quality data.

43. (New)   An information processing apparatus comprising:

a reading ~~means for reading~~device configured to read data and improvement information

used for improving the quality of the data from a recording medium which stores the data and the

improvement information;

an improvement-information requesting ~~means for requesting~~device configured to request

another improvement information used for improving the quality of the data read by the reading

means; and

a quality improving ~~means for improving~~device configured to improve the quality of the

data according to at least both the improvement information and the another improvement

information obtained according to a request made by the improvement-information requesting

~~means~~device and for outputting high-quality data,

wherein the data is degraded data obtained by degrading the original data,

wherein the quality improving ~~means~~device can restore the original data from the

degraded data according to at least both the improvement information and the another

improvement information,

wherein the data is first sub-sampled data obtained by sub-sampling the original data at a

first phase and the improvement information is second sub-sampled data obtained by sub-

sampling the original data at a second phase; and

wherein the quality improving ~~means~~device combines the first sub-sampled data, which

is the data; the second sub-sampled data, which is the improvement information; and third sub-

sampled data obtained by sub-sampling the original data at a third phase, which is the another

improvement information, to output high-quality data having higher quality than the data.

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44. (New)　　　　　An information processing apparatus according to Claim 43, wherein the data is first sub-sampled data obtained by sub-sampling the original data at a first phase and the improvement information is second sub-sampled data obtained by sub-sampling the original data at a second phase; and

the quality improving ~~means~~ device comprises:

an extracting ~~means for extracting~~ device configured to extract at least first sub-sampled data, second sub-sampled data, and third sub-sampled data around the target data in the high-quality data;

a class-classification ~~means for performing~~ device configured to perform class-classification according to data extracted by the extracting ~~means~~ device and for outputting a class; and

a prediction ~~means for predicting~~ device configured to predict the target data from the extracted data according to the class output from the class-classification ~~means~~ device.

45. (New)　　　　　An information processing apparatus according to Claim 44, wherein the extracting ~~means~~ device extracts first taps and second taps from at least the first sub-sampled data, the second sub-sampled data, and the third sub-sampled data around the target data in the high-quality data;

the class-classification ~~means~~ device performs class-classification according to the first taps and outputs a class; and

the prediction ~~means~~ device predicts the target data by linear first-order coupling of the

second taps and learned-in-advance prediction coefficients according to the class output from the

class-classification ~~means~~device.

46. (New)   An information processing apparatus comprising:

a reading ~~means for reading~~ device configured to read data and improvement information

used for improving the quality of the data from a recording medium which stores the data and the

improvement information;

an improvement-information requesting ~~means for requesting~~ device configured to

request another improvement information used for improving the quality of the data read by the

reading ~~means~~device; and

a quality improving ~~means for improving~~ device configured to improve the quality of the

data according to at least both the improvement information and the another improvement

information obtained according to a request made by the improvement-information requesting

~~means~~ device and for outputting high-quality data,

wherein the quality improving ~~means~~device comprises:

an extracting ~~means for extracting~~ device configured to extract degraded data

around the target data in the high-quality data;

a class-classification ~~means for performing~~ device configured to perform class-

classification according to data extracted by the extracting ~~means~~device and for

outputting a class; and

a prediction ~~means for predicting~~ device configured to predict the target data from

the extracted data according to the class output from the class-classification ~~means~~device,

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wherein the data is degraded data obtained by degrading the original data,

wherein the quality improving ~~means~~ device can restore the original data from the

degraded data according to at least both the improvement information and the another

improvement information.

47. (New)   An information processing apparatus according to Claim 46,

further comprising a prediction-coefficient storage ~~means for storing~~ device configured to store

prediction coefficients obtained by learning in advance between the original data and the

degraded data,

wherein the prediction ~~means~~ device predicts the target data by linear first-order coupling

of the extracted data and the prediction coefficients according to the class output from the class-

classification ~~means~~ device; and

the improvement information is a part of the prediction coefficients.

48. (New)   An information processing apparatus according to Claim 47,

wherein the extracting ~~means~~ device extracts first taps and second taps from degraded data

around the target data in the high-quality data;

the class-classification ~~means~~ device performs class-classification according to the first

taps and outputs a class; and

the prediction ~~means~~ device predicts the target data by linear first-order coupling of the

second taps and the prediction coefficients according to the class output from the class-

classification means.

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49. (New)　　　　　An information processing apparatus comprising:

a reading ~~means for reading~~ device configured to read data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

an improvement-information requesting ~~means for requesting~~ device configured to request another improvement information used for improving the quality of the data read by the reading ~~means~~ device;

a quality improving ~~means for improving~~ device configured to improve the quality of the data according to at least both the improvement information and the another improvement information obtained according to a request made by the improvement-information requesting ~~means~~ device and for outputting high-quality data; and

an improvement-information sending ~~means for sending~~ device configured to send the improvement information to another information processing apparatus,

wherein the data is degraded data obtained by degrading the original data,

wherein the quality improving ~~means~~ device can restore the original data from the degraded data according to at least both the improvement information and the another improvement information,

wherein the data is high-order bits of the original data and the improvement information is a part of low-order bits of the original data; and

wherein the quality improving ~~means~~ device combines the high-order bits of the original data, which is the data; the part of low-order bits of the original data, which is the improvement information; and the other part of lower-order bits of the original data, which is the another improvement information, to output high-quality data having higher quality than the data.

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50. (New)   An information processing apparatus according to Claim 49, further

comprising a determination ~~means for determining~~ device configured to determine whether the

quality improving means can apply quality improvement processing to the data according to the

improvement information and at least one piece of the another improvement information

obtained according to a request made by the improvement-information requesting ~~means~~ device,

wherein the quality improving ~~means~~ device improves the quality of the data according to

a result of determination made by the determination ~~means~~ device and outputs high-quality data.

51. (New)   An information processing apparatus comprising:

a reading ~~means for reading~~ device configured to read data and improvement information

used for improving the quality of the data from a recording medium which stores the data and the

improvement information;

an improvement-information requesting ~~means for requesting~~ device configured to

request another improvement information used for improving the quality of the data read by the

reading ~~means~~ device;

a quality improving ~~means for improving~~ device configured to improve the quality of the

data according to at least both the improvement information and the another improvement

information obtained according to a request made by the improvement-information requesting

~~means~~ device and for outputting high-quality data; and

an improvement-information sending ~~means for sending~~ device configured to send the

improvement information to another information processing apparatus,

wherein the data is degraded data obtained by degrading the original data,

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wherein the quality improving ~~means~~ device can restore the original data from the

degraded data according to at least both the improvement information and the another

improvement information,

wherein the data is first sub-sampled data obtained by sub-sampling the original data at a

first phase and the improvement information is second sub-sampled data obtained by sub-

sampling the original data at a second phase; and

wherein the quality improving ~~means~~ device combines the first sub-sampled data, which

is the data; the second sub-sampled data, which is the improvement information; and third sub-

sampled data obtained by sub-sampling the original data at a third phase, which is the another

improvement information, to output high-quality data having higher quality than the data.

52. (New)   An information processing apparatus according to Claim 51, wherein

the data is first sub-sampled data obtained by sub-sampling the original data at a first phase and

the improvement information is second sub-sampled data obtained by sub-sampling the original

data at a second phase; and

the quality improving ~~means~~ device comprises:

an extracting ~~means for extracting~~ device configured to extract at least first sub-sampled

data, second sub-sampled data, and third sub-sampled data around the target data in the high-

quality data;

a class-classification ~~means for performing~~ device configured to perform class-

classification according to data extracted by the extracting ~~means~~ device and for outputting a

class; and

a prediction ~~means for predicting~~ device configured to predict the target data from the extracted data according to the class output from the class-classification ~~means~~ device.

53. (New)   An information processing apparatus according to Claim 52, wherein the extracting ~~means~~ device extracts first taps and second taps from at least the first sub-sampled data, the second sub-sampled data, and the third sub-sampled data around the target data in the high-quality data;

the class-classification ~~means~~ device performs class-classification according to the first taps and outputs a class; and

the prediction ~~means~~ device predicts the target data by linear first-order coupling of the second taps and learned-in-advance prediction coefficients according to the class output from the class-classification ~~means~~ device.

54. (New)   An information processing apparatus comprising:

a reading ~~means for reading~~ device configured to read data and improvement information used for improving the quality of the data from a recording medium which stores the data and the improvement information;

an improvement-information requesting ~~means for requesting~~ device configured to request another improvement information used for improving the quality of the data read by the reading ~~means~~ device;

a quality improving ~~means for improving~~ device configured to improve the quality of the data according to at least both the improvement information and the another improvement

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information obtained according to a request made by the improvement-information requesting

~~means~~ device and for outputting high-quality data; and

an improvement-information sending ~~means for sending~~ device configured to send the

improvement information to another information processing apparatus,

the quality improving ~~means~~ device comprises:

an extracting ~~means for extracting~~ device configured to extract at least first sub-

sampled data, second sub-sampled data, and third sub-sampled data around the target data

in the high-quality data;

a class-classification ~~means for performing~~ device configured to perform class-

classification according to data extracted by the extracting ~~means~~ device and for

outputting a class; and

a prediction ~~means for predicting~~ device configured to predict the target data from

the extracted data according to the class output from the class-classification ~~means~~ device,

wherein the data is degraded data obtained by degrading the original data, and

wherein the quality improving means can restore the original data from the degraded data

according to at least both the improvement information and the another improvement

information,

55. (New)   An information processing apparatus according to Claim 54, further

comprising a prediction-coefficient storage ~~means for storing~~ device configured to store

prediction coefficients obtained by learning in advance between the original data and the

degraded data,

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wherein the prediction ~~means~~ device predicts the target data by linear first-order coupling

of the extracted data and the prediction coefficients according to the class output from the class-

classification ~~means~~ device; and

the improvement information is a part of the prediction coefficients.

56. (New)   An information processing apparatus according to Claim 55, wherein

the extracting ~~means~~ device extracts first taps and second taps from degraded data around the

target data in the high-quality data;

the class-classification ~~means~~ device performs class-classification according to the first

taps and outputs a class; and

the prediction ~~means~~ device predicts the target data by linear first-order coupling of the

second taps and the prediction coefficients according to the class output from the class-

classification ~~means~~ device.

57. (New)   An information processing apparatus comprising:

a reading ~~means for reading~~ device configured to read data and improvement information

used for improving the quality of the data from a recording medium which stores the data and the

improvement information;

an improvement-information requesting ~~means for requesting~~ device configured to

request another improvement information used for improving the quality of the data read by the

reading ~~means~~ device;

a quality improving ~~means for improving~~ device configured to improve the quality of the

data according to at least both the improvement information and the another improvement

information obtained according to a request made by the improvement-information requesting

~~means~~ device and for outputting high-quality data; ~~and~~

an improvement-information sending ~~means for sending~~ device configured to send the

improvement information to another information processing apparatus; and

an improvement-information-request-signal receiving ~~means for receiving~~ device

configured to receive an improvement-information request signal indicating that another

information processing apparatus requests the improvement information,

wherein the improvement-information sending ~~means sends~~ device is configured to send

the improvement information to the another information processing apparatus according to an

improvement-information request signal received by the improvement-information-request-

signal receiving ~~means~~ device.